Honeywell

STT 3000 Series STT250

SMART TEMPERATURE TRANSMITTER
Dual-Input Model STT25T

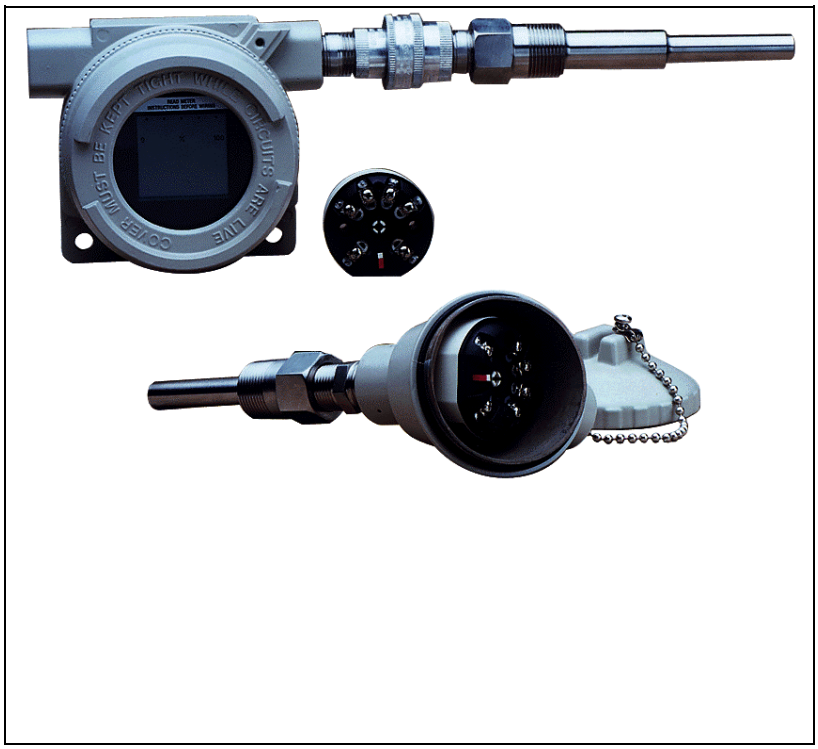
EN0I-6091 7/04 PRODUCT SPECIFICATION SHEET

OVERVIEW

Honeywell's STT 3000 family of microprocessor based transmitters covers the full spectrum of temperature measurement. Choose the top-tier STT350 for super Smart performance transmitters, the STT250 for competitive performance in a compact head mount package, or the low-tier PC configurable STT150 for fit-and-forget applications. See Product Specification Sheets :

- EN0I-5222 for STT350
- EN0I-6031 for STT250 (models STT25M/ H/ D)
- EN0I-6063 for STT150 (models STT15R/ U/ S)

This Product Specification Sheet describes the latest addition to the STT250 range – the dual input **STT25T** targeted to provide secure/ redundant measurement and reduced maintenance costs by auto sensor self checking.



PRODUCT DESCRIPTION

The STT25T can accept two independent temperature sensor inputs – either Pt100 or thermocouples Types J, K, T or E. The primary sensor is used to drive the 4-20mA output, while the secondary sensor can be used as a redundant back-up in case the primary sensor fails, or can be used for cross-checking the stability of the primary sensor.

The STT25T supports the HART* communications protocol for ease of configuration and maintenance checking of sensor integrity via any of the listed HART Communication Foundation tools.

The transmitter is 2-wire powered and gives an output 4-20mA signal linearized to temperature over the 2 power wires. Lead wire compensation is provided for RTD (Resistance Temperature Detectors) and internal digital cold junction compensation is provided for thermocouples. MilliVolt and Ohms sensor inputs can also be accepted.

FEATURES

- Direct sensor head mounting in DIN Form A housing. Housing materials include aluminum, 316SS and cast iron.
- Mounting options include wall, pipe, DIN rail, field or direct sensor head mounting.
- Single model accepts input signals from two RTD or thermocouple or mixed sensor types Pt100, J, K, T or E.
- Suitable for 3- or 2-wire Pt100.
- Hard-wired upscale/ downscale failsafe link to ensure secure operation in the event of a failure.
- Open circuit sensor analysis carried out in every measurement cycle.
- Selectable latching/non-latching failsafe operation for open circuit sensor.
- Integral analog or digital indication meter option.
- Analog to Digital converter validated frequently.
- Configuration adjustments and diagnostics checks can be made either locally or remotely over the signal wires from anywhere along their route. This enables major savings in manpower time during commissioning, start-up and maintenance activities.

Use the MC Toolkit Configurator, the HART hand-held communicator, or HART PC tool to configure the transmitter for any of these sensors/ applications.

Accuracies stated overleaf are available merely by selecting the sensor type and range (i.e., without user calibration).

Calibration of the LRV/URV end points typically will give accuracy improvements of two times. Sensor errors can be calibrated out by calibrating to the specific sensor either by having it at the LRV/URV temperatures or by simulation of the known values.

In addition, all units pass through Environmental Stress Screening by fast cycling between -40°C and +85°C to ensure maximum product reliability. During this process the ambient temperature coefficients are determined for each unit and burned into memory to ensure temperature compensation over a wide range of operating conditions.

Performance Under Rated Conditions

Sensor	*Digital Accuracy over Normal Range* ℃ (℉)	*D/A Accuracy % of span*	*Digital Accuracy over Maximum Range* ℃ (℉)	*Standards* *(All IEC referenced sensors use the ITS-90 temperature scale)*
Pt100	0.15C for -200 to 450 (-328 to 842)	0.025%	0.25C for -200 to 850C (-328 to 1562)	IEC 60751 (α=0.00385)
E	0.30C for 0 to 1000 (32 to 1832)	0.025%	0.60C for -200 to 1,000C (-328 to 1832)	IEC 60584-1
J	0.30C for 0 to 800 (32 to 1472)	0.025%	0.70C for -200 to 1,200C (-328 to 2192)	IEC 60584-1
K	0.60C for -120 to 1370 (-191 to 2498)	0.025%	0.90C for -200 to 1370C (-328 to 2498)	IEC 60584-1
T	0.30C for -100 to 400 (-148 to 752)	0.025%	0.5C for -250 to 400C (-418 to 752)	IEC 60584-1

SPECIFICATIONS

Operating Conditions

Parameter	Reference Condition	Rated Condition	Operative Limits	Transportation And Storage
Ambient temperature °C	23 °C ± 2	-40 to +85	-40 to +85	-50 to +100
Humidity				
Rack mounted % RH	10 to 55	5 to 95	5 to 100	5 to 100
In field housing % RH	10 to 55	5 to 100	5 to 100	5 to 100
Supply voltage	Voltage range 10.8 to 35 Vdc at the transmitter terminals			
Output current	Current overrange 3.8 to 20.8 mA. Failsafe limits < 3.8 and 21.8 mA			
Load resistance	0 to 1110Ω			
Vibration	Maximum of 4g over 15 to 200Hz (restricted to 3g with indication meter).			
Shock	Maximum of 40g.			

Performance Specifications

Output D/A accuracy: ±0.025% of span

Cold Junction accuracy: ±0.5°C

Total reference accuracy: Analogue 4-20mA mode = Digital accuracy + Output D/A accuracy + CJ accuracy (T/Cs only)

Total reference accuracy: Digital DE mode = Digital accuracy + CJ accuracy (T/Cs only).

(example: transmitter operating in analogue mode with Pt100 sensor and 0 to 200°C range.
Total reference accuracy =
0.15+(200/100)*0.025 = 0.2°C.
Digital ambient temperature effect (per 10°C change from 23°C ref.): RTDs or Ohms : 0.050% of reading in Ohms.
: T/Cs or mV : 0.080% of reading in mV.

Output D/A ambient temp. effect (per 10°C change from 23°C ref.): ±0.045% of span.

Cold Junction ambient temperature effect: 40: 1 rejection for ambient temperature changes from 23°C reference.

Total output ambient temperature effect : Analogue 4-20mA mode = Digital effect + Output D/A effect + CJ effect (T/Cs only).

Total output ambient temperature effect: Digital DE mA mode = Digital effect + CJ effect (T/Cs only).

Power supply voltage effect: 0.005% of Max span per Volt.

Stability/time drift: 0.05% of max span per year.

Additional Parameters

Output: 4-20mA or Honeywell digital DE protocol. HART and DE available with 4-20mA output.

Adjustment range: No limits to adjustments within the Maximum Range except minimum span limit of 1 engineering unit e.g. 1°C

Damping time constant: Adjustable from 0 to 102 seconds digital damping.

Output response time:
1 second to reach 63% of final value with 0 secs damping.

Output update time
0.5 secs approximately.

Input/ output galvanic isolation Withstands 500Vac dielectric strength test for 1 minute.

Sensor open circuit
Open circuit/ burnout detection is user selectable. Upscale or downscale with critical status message. Latching or non-latching sensor burnout action.

Common mode rejection
120dB (1 million to 1) from 50Hz to 50 kHz.

Series mode rejection
40dB (100 to 1) for 50 or 60Hz ±0.5Hz. (with internal software filter set to local power line frequency).

EMC compliance

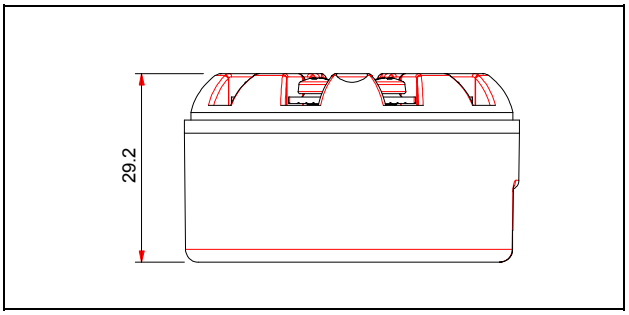
In compliance with 89/336/EEC, ElectroMagnetic Compatibility (EMC) Directive.

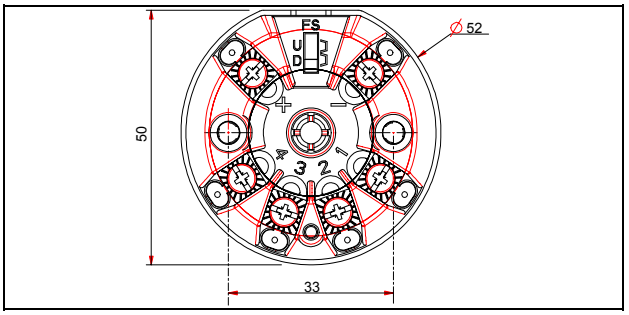
RFI rejection: ±0.1% of span at 30V/m over 20 to 1,000MHz in metallic housing and with shielded cables.

Physical Mounting, Construction and Integral Meters

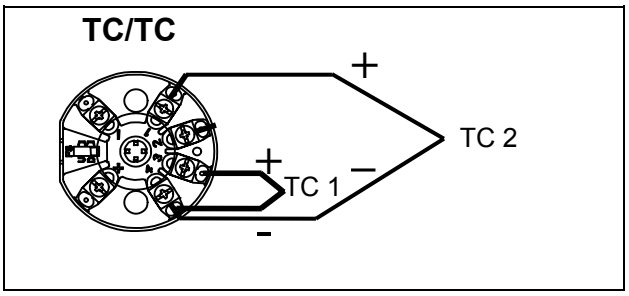
The STT250 Temperature Transmitter is designed for mounting in a DIN Form A housing for direct installation with the temperature sensor or can be provided in a remote pipe or wall mount housing. Details on the various housings and integral meters available are given in specification sheet EN0I-6032. The STT250 Temperature Transmitter module can also be DIN rail mounted to a top hat or “G” rail via a clip.

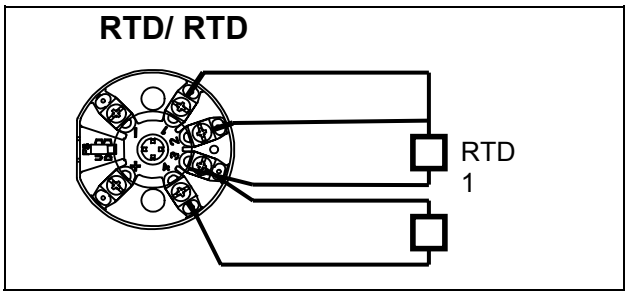
STT250 Module Dimensions (in mm)

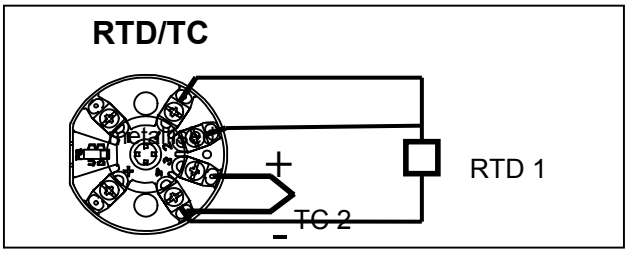




STT250 Connections







Materials of Construction

Terminal Block	Noryl
Connection Screws	M3 Nickel plated brass
Module Housing	Cycoloy (PC/ABS) with interior surface
Weight	0.075 kg (0.2 lbs)

Approvals

The STT25T Temperature Transmitter module is Intrinsically Safe to ATEX, FM and CSA standards when used with a suitable safety barrier. It is zone 2 and explosion-proof to ATEX, FM and CSA standards when installed in a suitable housing. See the Model Selection Guide, Table VII, for detailed safety approvals covering both the STT25T module only or for the STT25T module supplied in a housing.

Probe and Thermowell Availability

STT250 can be supplied complete with any of the previously listed thermocouple or RTD sensors and with any of a wide range of thermowells. The sensors are of Mineral Insulated (MI) construction with lengths of up to 2 meters available. For the auto sensor cross checking applications, the sensors are available in duplex construction i.e., two identical RTD or thermocouples in a single sheath. For redundant sensors, it is recommended that instead of the standard 6mm diameter construction, two 3mm diameter sensors are ordered. For the direct head mount installation the sensor is supplied with a mounting plate for STT250 module attachment and fixing screws to provide the spring-loaded attachment to the housing. For EEx d IIC T6 applications a flame trap is included between the sensor and sensor entry of the housing. See details on the standard sensors available in EN0I-6033 for Europe, or 34-44-29-01 for North America.

The range of thermowells available as a total thermal solution cover almost every possible requirement :

Materials:	Carbon Steel, 304SS, 316SS, 316L SS, Hastelloy C-276, Monel 400, Inconel, and many others
Thermowell Types:	Threaded or flanged, with or without lagging and solid drilled, forged or fabricated construction
Flange Types:	Raised Face, Flat Face and Ring Type joint flanges available in 1 to 3 inch sizes or 15 to 200mm
Flange Ratings:	ANSI 150 to 2500, BS 4504 NP6 to NP100, BS 10 Tables D to K and API 6A 5000 to 15000lb

Other materials, types and accessories are available on request.

Instructions

- Choose availability column based on mounting configuration.
  A dot denotes unrestricted availability. A letter denotes restricted availability.
  Blank denotes unavailable - choose alternate mounting. Restrictions follow Table VII.
- Select the desired Key Number based on the desired communications protocol.
- Select options and approvals from Tables.

Key Number	I	II	III	IV	V	VI	VII
STT25_	- _	- _ _ _	- _ _ _	- _ _ _	- _ _ _	- _ _	- _ _

HOW WILL THE UNIT BE MOUNTED?

Module only (no housing), to be DIN rail or wall mounted
Module to be "head mounted" directly to the sensor in smaller housing
Module to be "field mounted" in Explosion-Proof housing remotely from or directly to the sensor

Key Number Description	Selection	Availability		
Smart Temperature Transmitter Module				
4-20mA Output, SFC/SCT Configurable	STT25M	◆		◆
HART Protocol, 4-20mA Output	STT25H	◆		◆
Digital DE/ 4-20mA Output, for Digital Integration	STT25D	◆		◆
Dual input, HART Protocol, 4-20mA output	STT25T	◆		◆
All modules carry the following approvals:				
CE Mark for compliance to EN 50081-2 and 50082-2				
Russian Certificate of Pattern Approval No. 2064 of Jan. 1998				
Choose additional safety approvals required in Table VII.				

TABLE I - Sensor, Probe and Thermowell Accessories

No Integral Sensor Probe or Thermowell Supplied	0	◆		◆
Sensor Probe and/or Thermowell mounted or tested with STT 3000 (1)	1	◆		

TABLE II - Transmitter Housing and Integral Meters (Reference EN0I-6032 for details)

Housing	No Housing Supplied	0 _ _			◆
	Field Mount (2) Explosion-Proof Aluminum with Baked on Beige Polyester/Epoxy Paint	E _ _	◆		
	Field Mount (2) Explosion-Proof Aluminum with Beige Epoxy Paint	X _ _	◆		
	Field Mount (2) Explosion-Proof 316 Stainless Steel	T _ _	◆		
Cable/ Conduit Entry	Not Applicable - No Housing Supplied	_ 0 _			◆
	1/2" NPT Cable/ Conduit Entry	_ N _	◆		
	M20 x 1.5 Cable/ Conduit Entry	_ M _			
Integral Meter (3)	No Integral Meter Supplied	_ _ 0	◆		◆
	Analogue Meter for Field Mount Housing	_ _ M	◆		
	Engineering Unit Meter for Field Mount Housing	_ _ E	**g**		
	Smart Meter for Field Mount Housing	_ _ S	**a**		

(1) See Price Pages 13:TP-1 to 15 for sensor/well selections and pricing.

(2) With a Field Mount Housing, 20 characters max. of customer information is available on the nameplate at no charge. (See 13:STT-OE pages for ordering instructions.)

(3) Remote Meter available as Model RMA300. See Price Page 13:RM-1.

TABLE III - Configuration, Tagging and Manual **Selection** ↓ ↓ ↓

Configuration	None - Factory Default Configuration Supplied	0 _ _	◆		◆
	Transmitter Configuration (See 13:STT-OE pages for choices	T _ _	◆		◆
Customer Tagging [4]	No Tagging Required	_ 0 _	◆		◆
	316 SS Wired-on Customer I.D. Tag (4 lines, 28 chars. per line, customer specified information)	_ T _	◆		
	316 SS Wired-on Customer I.D. Tag (blank)	_ B _	◆		
Operator's Manual [5]	None	_ _ 0	◆		◆
	English Language Version (one per five units)	_ _ E	◆		◆
	French Language Version (one per five units)	_ _ F	◆		◆
	Spanish Language Version (one per five units)	_ _ S	**b**		**b**
	Chinese Language Version (one per five units)	_ _ C	**b**		**b**

TABLE IV - Optional Equipment

Mounting Arrangement	No Mounting Arrangment Supplied		0 _ _	◆		◆
	Carbon Steel Mounting Bracket for 2" Pipe		M _ _	◆		
	Stainless Steel Mounting Bracket for 2" Pipe		S _ _	◆		
	Spring Loading Mounting set		L _ _			◆
	DIN Rail Mounting via Clip (to Top Hat or "G" Rail)		D _ _			◆
316 SS Conduit Adaptor for Wiring Entry	No Adaptor(s) Supplied		_ 0 _	◆		◆
	1/2" NPT to M20 x 1.5 (EEx d IIC approved)	1 Adaptor	_ 1 _	**c**		
		2 Adaptors	_ 2 _	**c**		
	1/2" NPT to 3/4" NPT	1 Adaptor	_ 3 _	◆		
Lightning Protection	No Lightning Protection Supplied		_ _ 0	◆		◆
	Externally Mountable to Field Mount Housing		_ _ L	**e**		
	Internal Surge/ Lightning Protection		_ _ S	◆		

TABLE V - Optional Extended Warranty Coverage & Certificates

Optional Extended Warranty	Standard Warranty		0 _ _	◆		◆
	Additional Warranty - 1 year		1 _ _	◆		◆
	Additional Warranty - 2 years		2 _ _	◆		◆
	Additional Warranty - 3 years		3 _ _	◆		◆
Optional Certificate [5]	No Transmitter Configuration/ Calibration Certificate		_ 0 _	◆		◆
	Transmitter Configuration/ Calibration Certificate		_ D _	◆		◆
	FMEDA (SIL) + Config./ Calibration Certificate		_ S _	**g**		**g**
	No Certificate of Conformance/ Origin		_ _ 0	◆		◆
	Certificate of Conformance/ Origin		_ _ C	◆		◆
	FMEDA (SIL) + Conformance/ Origin Certificate		_ _ S	**g**		**g**

TABLE VI - Additional Features

No Selection			00	◆		◆

TABLE VII - Safety Approvals

Approval Body	Approval Type	Location or Classification	Selection			
None	No approval body certifications included		00	◆		◆
Factory Mutual	Explosionproof Dust-Ignitionproof Intrinsically Safe Nonincendive Suitable for Outdoor Location	Class I, Div. 1, Groups A,B,C,D Class II, III Div. 1, Groups E,F,G Class I, II, III, Div. 1, Groups A,B,C,D,E,F,G Class I, Div. 2, Groups A,B,C,D Class II, III, Div. 2, Groups F, G Enclosure Type 4X	1C	**f**		
	Explosionproof Dust-Ignitionproof Intrinsically Safe Nonincendive Suitable for Outdoor Location	Class I, Div. 1, Groups B,C,D (with Indicator) Class II, III, Div. 1 Groups E,F,G Class I, II, III, Div. 1, Groups A,B,C,D,E,F,G Class I, Div. 2, Groups A,B,C,D Class II, III, Div. 2, Groups F,G Enclosure Type 4X	1J	◆		
	Intrinsically Safe Nonincendive	Class I, II, III, Div. 1, Groups A,B,C,D,E,F,G Class I, Div. 2, Groups A,B,C,D	1G		◆	◆
CSA	Explosion-Proof Dust Ignition-Proof Intrinsically Safe Suitable for Outdoor Location	Class I, Div. 1, Groups B,C,D Class II, III, Div. 1, Groups E,F,G Class I, II, III, Div. 1, Groups A,B,C,D,E,F,G Class II, III, Div. 2, Groups F,G Enclosure Type 4X	2J	◆		
	Intrinsically Safe Suitable for	Class I, II, III, Div. 1, Groups A,B,C,D,E,F,G Class I, Div. 2, Groups A,B,C,D	2G		◆	◆
INMETRO (Brazil)	Intrinsically Safe Zones 0/1	Ex ia IIC T4, T5, T6 (Module Only)	6S			**b**
	Intrinsically Safe, Zones 0/1	Ex ia IIC T4, T5, T6 Enclosure rated IP 66/67	6S	**b**		**b**
	Flameproof, Zone 1	Ex d IIC T6 Enclosure rated IP 66/67	6D	**p**		
ATEX*	Intrinsically safe Zone 0/1	Ex II 1G EEx ia IIC T6, T5, T4 (Module)	3S	◆		◆
	Flameproof, zone 1	Ex II 2G EEx d IIC T6 Enclosure rated IP 66/67	3D	**p**		◆
	Non-Sparking zone 2	Ex II 3G EEx nA, T6, Zone 2 (Honeywell) Module to installed in enclosure rated IP 54 minimum	3N	◆		◆
	Multiple Marking** Int. Safe, Zone 0/1, or Flameproof, Zone 1, or Non-Sparking, Zone 2	Ex II 1 G EEx ia IIC T4, T5, T6 Ex II 2 G EEx d IIC T5, T6 Ex II 3 G EEx nA, IIC T6 (Honeywell) Enclosure IP 66/67	3H	**p**		

*See ATEX installation requirements in Operator's Manual EN1I-6190

**The user must determine the type of protection required for installation of the equipment. The user shall then check the box [✔] adjacent to the type of protection used on the equipment certification nameplate. Once a type of protection has been checked on the nameplate, the equipment shall not then be reinstalled using any of the other certification types.

RESTRICTIONS

Restriction		Available Only With		Not Available With
Letter	**Table**	**Selection**	**Table**	**Selection**
a	II	STT25D and STT25M	II	STT25H and STT25T
b			Key No	STT25T (Choose other language)
e			VII	3D
f	II	EN0, XN0, TN0	I	1
g	Key No.	STT25H, STT25M		See Note6
p	II	E _ _, X _ _, T _ _	I	1

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